

24. (New) A sensor element for determining a concentration of gas components in gas mixtures, comprising:

a measuring gas chamber;

at least one pump cell which pumps oxygen at least one of into and out of the measuring gas chamber;

at least one concentration cell including at least one reference electrode and a measuring electrode, the at least one reference electrode interacting with the measuring electrode, the measuring gas chamber and the reference gas channel being situated in a same layer plane;

a reference gas channel, the at least one reference electrode being arranged in the reference gas channel, the reference gas channel providing the at least one reference electrode contact with a reference gas intake; and

a partition arranged between the measuring gas chamber and the reference gas channel, the partition having a measuring-gas side and a reference-gas side, the partition including a base, the base being a ceramic paste applied to an adjacent solid electrolyte foil.

25. (New) The sensor element as recited in claim 24, wherein the sensor element is configured to determine an oxygen concentration in exhaust gases of internal combustion engines.

26. (New) The sensor element as recited in claim 24, wherein a geometry of the partition is adapted to a reference-gas-side boundary of the measuring electrode.

27. (New) The sensor element as recited in claim 24, wherein the measuring electrode has an annular design and is formed in the measuring gas chamber, and the partition is a segment of a circular ring.

28. (New) The sensor element as recited in claim 24, wherein the reference electrode has a boundary on a side of the measuring gas chamber, the boundary being adapted to a shape of the reference-gas side of the partition.

29. (New) The sensor element as recited in 24, wherein the reference electrode has a tapered surface, the surface having a first edge toward an end of the reference gas channel nearest the measuring gas chamber and a second edge toward an end of the reference gas channel nearest the

reference gas intake, the surface being tapered from the first edge to the second edge, the reference electrode surface approaching a center point of the measuring electrode.

30 [New] The sensor element as recited in claim 24, wherein at least a section of at least one of the reference gas channel and the reference electrode is led around the measuring gas chamber.

31 [New] The sensor element as recited in claim 24, wherein the pump cell includes an inner pump electrode, the pump electrode being arranged in the measuring gas chamber opposite to the measuring electrode.

32 [New] The sensor element as recited in claim 24, wherein the measuring electrode is situated in the measuring gas chamber and forms an inner pump electrode of the pump cell.

33 [New] The sensor element as recited in claim 24, further comprising:
a large surface facing the gas mixture, the large surface having at least one opening; and
wherein the measuring gas chamber is coupled to at least one of the at least one opening on the large surface of the sensor element facing the gas mixture, the opening being substantially normal to an upper surface of the sensor element, the opening allowing the gas mixture to enter into the measuring gas chamber.

34 [New] The sensor element as recited in claim 33, wherein the measuring gas chamber is circular, a center point of the circle lying on a center line of one of the at least one opening.

35 [New] The sensor element as recited in claim 31, further comprising an annular diffusion barrier, the diffusion barrier arranged in front of the measuring electrode and the inner pump electrode in a diffusion direction of the gas mixture, the measuring electrode and the inner pump electrode being annular in design.

36 [New] The sensor element as recited in claim 33, wherein the reference electrode is situated on a side of the reference gas channel nearest the large surface of the sensor element exposed to the gas mixture.

37 [New] The sensor element as recited in claim 24, wherein two diametrically opposed reference electrodes are situated in the reference gas channel.

38 [New] The sensor element as recited in claim 24, wherein the measuring electrode includes a portion situated outside of the measuring gas chamber.

39 [New] The sensor element as recited in claim 24, wherein at least one of the at least one reference electrodes includes a portion situated outside of the reference gas channel (15).

40 [New] The sensor element as recited in claim 24, wherein the reference gas channel is at least partially filled in with a porous ceramic material.

41 [New] The sensor element as recited in claim 24, further comprising:
a first solid electrolyte foil exposed to the gas mixture; and
a solid electrolyte layer containing the measuring gas chamber and the reference gas channel;
wherein the solid electrolyte layer is directly deposited on the solid electrolyte foil.

42 [New] The sensor element as recited in claim 41, further comprising:
a second solid electrolyte foil;
a third solid electrolyte foil; and
a heating element arranged between the second and third solid electrolyte foils,
wherein the third solid electrolyte foil has a thickness dimensioned so that the heating element is approximately equidistant from two large surfaces of the sensor element.

43 [New] A method for manufacturing a sensor element for determining a concentration of gas components in gas mixtures, comprising:
providing a solid electrolyte foil; and
applying a solid electrolyte layer to the solid electrolyte foil by screen-printing a pasty ceramic material, the solid electrolyte layer including a measuring gas chamber and a reference gas channel.